FG system speed servo controller
BA6302A/BA6302AF/BA6303/BA6303F

The BA6302A and BA6303 are FG-system servo control ICs suitable for controlling the speed of VCR motors. They contain a hysteresis FG amplifier section, an S/H system F/V conversion section, an error amplifier section, and an inverter section.
Motor speed can be set with a high degree of freedom by an external CR. The start-up circuit allows quick and precise motor starting.
Motor speed can be controlled precisely at different levels by installing an FG program counter between the FG amplifier output and the F/V conversion input.

●Applications
Speed control of various motors including capstan motors, drum head motors, and reel motors

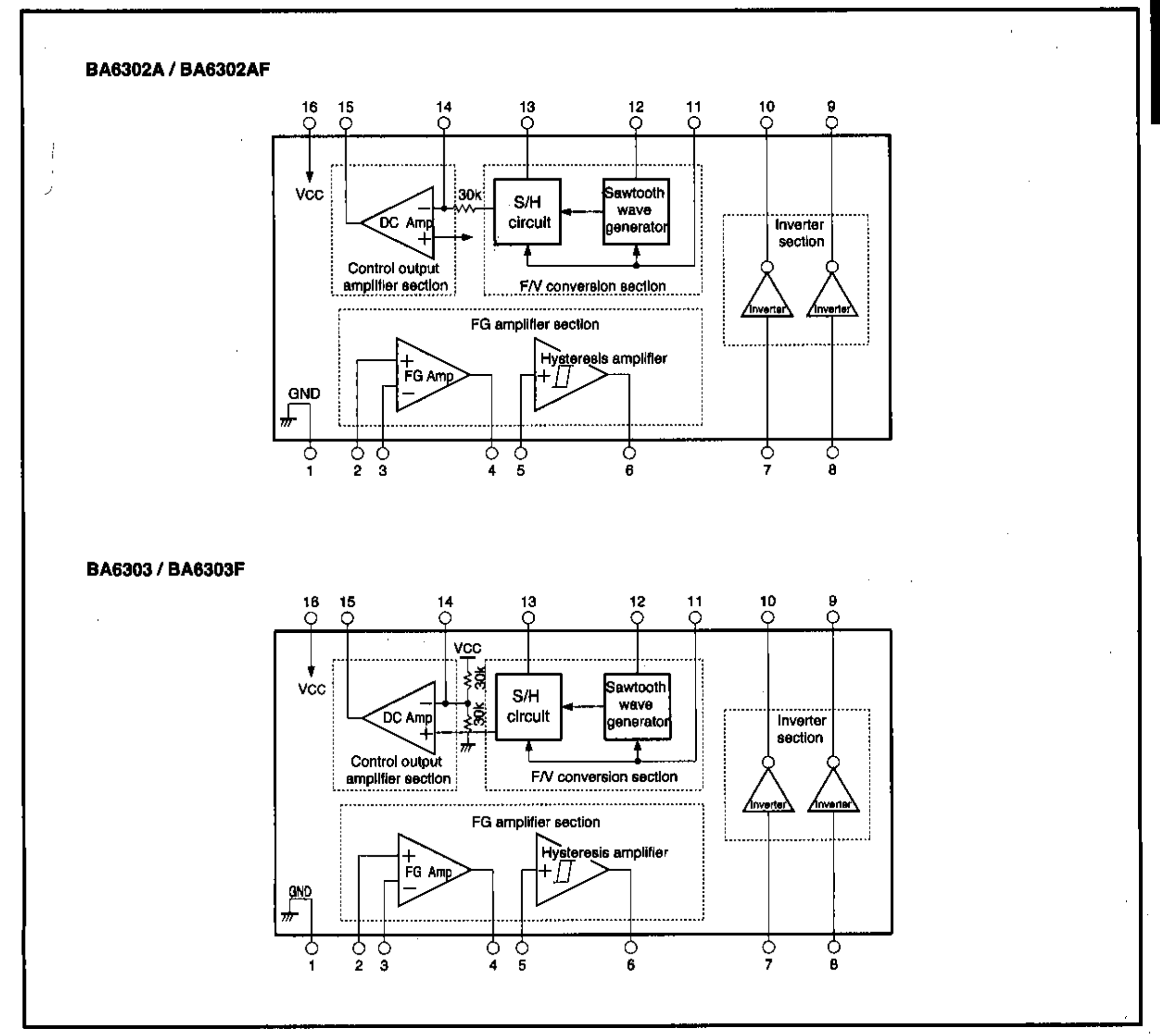
●Features
1) S/H system F/V converter allows speed setting with a stable external CR.
2) High hysteresis FG amplifier with high noise resistance.
3) Start-up circuit allows quick and precise motor starting.
4) Motor speed can be controlled at different levels by installing an FG program counter.
5) Low power consumption. (V_{CC}=9V, I_Q=2.3mA Typ.)
6) Stable operation with either 5, 9, or 12V supply voltage.
7) Two versatile inverters are built in.

●Absolute maximum ratings (Ta=25℃)

Parameter	Symbol	Limits	Unit
Power supply voltage	V_{CC}	15	V
Power dissipation	Pd	450*	mW
Operating temperature	Topr	−20～60	℃
Storage temperature	Tstg	−55～125	℃
Inverter circuit load current	I_L	10	mA

* Reduce power by 4.5 mW for each degree above 25℃.

●Block diagram



●Electrical characteristics (Unless otherwise noted, Ta=25℃, V_{CC}=9V)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Conditions
Operating supply voltage		V_{CC}	4.5	—	13.0	V	—
Quiescent current	BA6302A / AF	I_Q	1.7	2.6	3.4	mA	—
	BA6303 / F		1.4	2.3	3.1		
<FG amplifier section >							
DC bias potential		V_{FGB}	1.1	1.3	1.5	V	—
Base bias current		I_{bb1}	—	80	320	nA	—
Open loop voltage gain		A_{VO1}	65	75	—	dB	R_{FG}=1MΩ
Output level		V_{FGO}	2.0	2.6	3.0	V_{P-P}	R_{FG}=100kΩ
Hysteresis comparator bias current		I_{bb2}	—	600	1200	nA	BA6302A / BA6302AF ; I_{bb1}
Mid-hysteresis voltage accuracy		ΔV_{hym}	−140	−60	+30	mV	Difference electric potential from pin3
Potential difference with reference to pin 3		V_{hyw}	40	60	80	mV	—
Hysteresis amplifier output level		V_{hyo}	6.5	7.3	—	V_{P-P}	R_L=10kΩ
<F/V conversion section >							
Output temperature coefficient		ΔV_{FVT}	—	160	—	ppm / ℃	V_{FVO}=4.5V
Output drift		ΔV_{FVO}	—	0	—	mV	V_{FVO}=4.5V
Pin-12 base current		I_{bb3}	—	25	100	nA	—
Pin-13 base current		I_{bb4}	—	15	60	nA	—
Conversion efficiency		ΔFV	—	30	—	mV / Hz	R_T=120kΩ C_T=0.1μF F_G=100Hz
<Control output amplifier section >							
DC amplifier open loop gain		G_{VO2}	49	55	—	dB	—
Mid-bias voltage		V_B	4.2	4.6	5.0	V	—
DC amplifier output level	BA6302A / AF	V_{DCO}	6.1	6.3	—		R_{DC}=∞, R_L=20kΩ
	BA6303 / F			—			
<Inverter circuit>							
Input threshold voltage		V_{TH}	1.5	—	3.5	V	—
Input impedance		R_{IN}	20	30	—	kΩ	—
Output saturation voltage		V_{SAT}	—	0.2	0.3	V	R_L=10kΩ, V_{IN}=V_{CC}
Output leakage voltage		I_L	—	0	1	μA	V_{CE}=13.0V, V_{IN}=0V

●External dimensions (Units: mm)

